

# **Toward conforming an alternative model for internship (professional practice) in mathematics education**

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## **Introduction**

The teaching formation models in mathematics that are currently being used in our country focus on the fact that the professional knowledge of the student who majors in mathematics has to be the result of adding up the Schooling-Academic knowledge (mathematics, physics, and so on) and the Education Sciences knowledge. The organization of the lesson plans has a clear separation between theory and practice. In the case of the Education Sciences – including specific didactic and internship – a solution to the problem of the relation between theory and practice is suggested by providing the students with certain technical or practical knowledge which is out of context from reality and does not deepen at all into any ideological doctrine. All of the above generate conservative and out-of-context tendencies in our future mathematics teachers. Most of these tendencies are not in keeping with the interests of the low-class majorities in our country. An example of this is that, during the training process of the future math teachers, few times are questions as to what kind of mathematics our high school students need asked. These trainees' necessities are oriented to joining the job market as fast as possible, so that economic necessities of their families can be covered. Likewise, we can see that the mathematics taught throughout the courses is out of context from the educational reality of the future math teacher. An example of this is that the moment they realize the various math topics they have learned during the course, they see that few times have they been taught how to present them.

In regard to the internship for teaching, this professional practice is considered a privileged moment in which the student applies theory in the professional development area, turning it into a time for verifying learned theory, rather than considering it a formation space. This concept of internship is much more related to the sense of logical positivism that we all know about, as to its results.

## **In the search for an alternative model for internship in teaching**

Upon revising the different prevalent models in the formation of mathematics teachers, we can see that some models tend to concentrate and see **theory** as the source of professional knowledge, and others do the contrary, that is, they concentrate in **experience** as the source, instead of the theory. In all models, there is a false dichotomy between theory and practice, seen as two different realities. We understand that any knowledge that the future mathematics teacher acquires makes sense if it comes from his experience and previous ideas, analyzing it at the same time with the help of the theory. This is why we think

that an alternative model for internship in teaching must work both aspects as a whole.

We also found out that these models in mathematics present an absolutist, outdated, out-of-context perspective of mathematics and education sciences, evidenced in math teachers that do not consider their place into the social reality. This problem was tried to solve by some practical and experimental tendencies, but due to lack of theory, deepening into comprehension of reality has been impossible. Consequently, we found out that the prevalent models dedicated to forming mathematics teachers in our institutes and universities do not favor or call for a revolutionary perspective in the teaching profession. In a sense, it is urgent that we propose alternatives for those institutions.

In the first place, we believe that theory and practice must be integrated; secondly, we must get rid of the simple vision of reality in each of the prevalent models; and lastly, it is imperative to create an ethical reference that allows the apprentice teacher to have a clear conscience of the importance of the teaching profession from a critical and reality-transforming perspective.

In our case, we are responsible for the curricular unit (subject) *internship*, which has the particularity of becoming the first chance of getting into the dynamics of an educational center and developing skills as future professionals for many students. Aware of the importance of this moment, we present this internship development proposal. In the first place, we will briefly explain the way we have organized its development, and then the guidelines that have led our work.

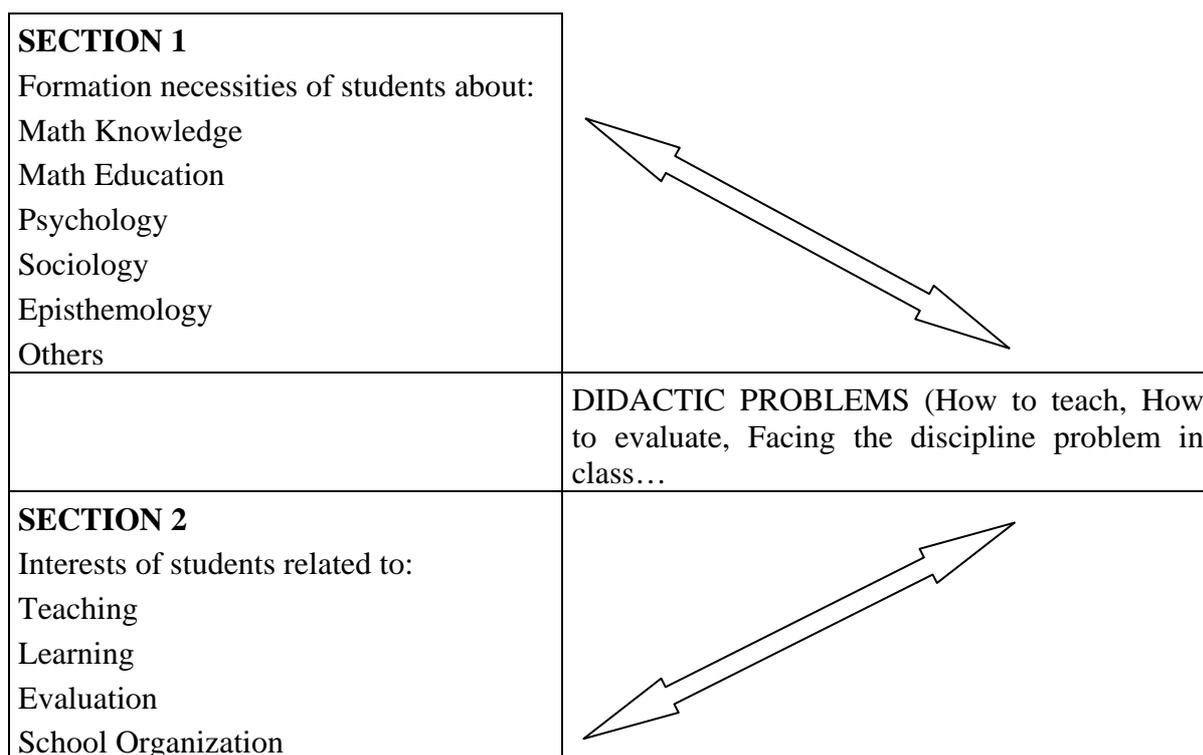
### **Organization of professional knowledge process presented**

The organization of the professional knowledge process we want is divided into two sections. The first section is related to the students forming as teachers' necessities, and the second section is related to their interests (see Fig.1)

Such necessities in the first section are determined by the knowledge, values, and competencies that the future teacher must have in order to become a real math teacher. They represent educational intentions in areas such as institutional, social, and teaching development. They cover disciplinary knowledge, and instruction related to knowledge theories as reference for guiding their actions (Porlan, 1998).

The second section is related to the students' interests regarding practical problems linked to the teaching of disciplinary knowledge and the institution.

We placed the problem areas related to teaching, learning, and scholar education at the institutes, between the two sections, that is, as part of the two sections. These areas are treated through analysis processes in and about the actions during the internship. Definitely, the idea is to make the problems in the reality guide the development of the subject. (Azcarate, 1996 Porlan et al., 1996 Ballenilla, 1995 Cooney, 1994) (See Fig. 1)



*Figure 1: Organization of the formation process*

### **Guidelines to consider in developing the internship**

For developing an alternative internship, we thought it was necessary to establish three general guidelines for leading our actions along the two semesters, so that the student gets involved with the educational center. These guidelines are:

The progressive complexity of knowledge.

The systematization as a starting point for rebuilding the professional knowledge of the future teacher.

The research-reflection as a privileged space and time for formation.

#### *The progressive complexity of knowledge*

When forming new knowledge in our future math teachers, it must be assumed that this formation goes progressively from a fragmentalized outlook of reality into a more complex one (Porlán y Rivero, 1998). This is why we have assumed the progressive nature of the problems and reflections through the formation process as a work guideline. Our experience with interns shows that the transformation of the teaching methods is not done by chance at all. Changes are progressive and zigzagging, from a simple vision of reality to a complex perspective of education (Parra and Luque, 1999).

In this progressive process of changes in the knowledge of the future teachers, we find three stages. These stages are not exactly and purely configured into all people, but we can distinguish common knowledge and action characteristics that are necessary for explanations in this investigation.

### First Stage: Beliefs and Professional Practice<sup>1</sup>

Every process of change, from the most prevalent to the one that we want to have in our students, is likely to modify beliefs that they are not compatible with the alternative model, so that there can be a change in the application of professional practice. This is why it is necessary to emphasize the following aspects in the first stage:

Recognition of math education problems in class.

Search for everyday prevalent models at the learning centers.

Dynamization of students' behavior, creating new expectations and interests for changing routine.

Comparison of theoretical and practical information that generate questions and necessities about their activities as interns at educational centers.

In no way should this emphasis be assumed as lineal or ascendent. These four fundamental aspects could occur simultaneously or partially. The idea is to try to recognize the dominant beliefs in the educational area and think of the epistemological nature of those beliefs and the influence in professional practice, generating in each student a process of uneducation (Pérez –Esclarín, 1997); understanding uneducation as the group of actions through which each of the participants in the formation process begins a deep process of reflection that enables them to start an “unassembling”<sup>2</sup> process in their beliefs about the academic discipline of their subject, as well as the teaching and learning processes, from the analysis of example situations in the educational field.

### Second Stage: Transition towards Desirable Professional Knowledge

This stage can be identified when the apprentices start proposing new ways to see teaching from questioning their beliefs and educational practices. This creates tension among students, as to the effectiveness and challenge of mathematics teaching-learning processes, and the interests and experiences of students at their educational centers. Out of experience, we can see that the students want to change, but at the same time fear that the changes will not bring appropriate learning for the students at the educational center. Along with this personal tension, the students also face the pressure exercised over them by their mates and the teachers at the educational center. About this, we would like to point that we have progressively incorporated teachers to educational centers, as part of the formation of interns, which has generated a simultaneous formation process between us and them. This way, we have not only eased those tensions among students, but also evolved – teachers at both the educational centers and

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<sup>1</sup> At this part of the research, we have practically assumed the names of the three stages pointed by Porlan and Rivero (1998) entirely. However, each stage was adapted to the realities of our professional practice.

<sup>2</sup> This “unassembling” of beliefs is seen in the piagetian sense of the notion of balance.

the University of Zulia – into more complex and critical professional development models.

We have begun to figure out the conceptions we have about teaching and building knowledge. Thus, we think that joining these teachers into the formation process of our interns gives us a chance to produce qualitative changes into the transformation of teaching.

### Third Stage: Consolidation of Desirable Professional Knowledge

This stage is characterized by a trainee whose teaching model is seen into a constructive and investigative perspective, and whose keywords in the professional field are the reflection and the changing action in the educational field.

From this perspective, the future math teacher is characterized by having a complex and critical conception of reality. We must humbly acknowledge from our experience that few trainees have reached this level of formation. We recognize that there are two great obstacles to overcome to reach this level: having an explicitly fragmented syllabus and not having enough educational actions that permit the trainee to reflectively join the professional field as a math teacher.

*Systematization as a starting point for rebuilding the professional knowledge of the future teacher*

Recording and reflecting on practice, hereby called systematization, is presented as a fast way to its theorization process, because it recognizes the context where it takes place, questions it, and looks for its relation to similar situations, leading the students into a deeper analysis (Jara, 1989). Besides, systematization helps improve the quality of reflective processes, and solutions to presented problems.

*The research-reflection, as a privileged space and time for formation*

By *research*, we do not mean the classical and scientific vision whose main subject is to keep the objective and positive position of sciences. This concept means forming the future teacher in the research field, as a chance to provide him/her with the minimum conditions for reflecting over the reality he/she analyses, committing him/her to it in such a way that he/she is able to beget changes in the professional practice.

### **As a conclusion**

Professional practice or Internship, as seen here, has gradually formed a critical and reflexive thinking about mathematics in our apprentices. This thinking has also reached math's teaching and learning, evidencing a qualitative change in teaching. The efforts for considering didactic problems about mathematics have had higher personal and collective awareness in our future teachers, considering our educational reality. All in all, in spite of our difficulties, we are convinced that the formation process of future math teachers can have changes in the educative and social reality.

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